REMARKS

Claims 1-4 are pending in this application, with claims 1, 2 and 4 being independent. Independent claim 4 has been amended. No new matter has been added by way of this amendment. Favorable reexamination and reconsideration of the action is respectfully requested in view of the foregoing amendments and following comments of the Applicants, which are preceded by related comments of the Examiner in small bold type:

Claim Objections

4. Claim 4 is objected to for the following minor informalities: In the last limitation, the claim recites "the computing device", which appears to mean "the computer".

Claim 4 has been amended to replace "the computing device" with "the computer" in the limitation pointed out by the Examiner.

Claim Rejections - 35 USC § 103

7. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harris (Mark J. Harris et al., "Physically-Based Visual Simulation on Graphics Hardware", September 2002, Proceedings of the ACM SIGGRAPGH/EUROGRAPHICS Conference on Graphics Hardware, pages 109-118 and 160) in view of Gamito (Manuel gamito et al., "Two-dimensional simulation of gaseous phenomena using vortex particles", 1995, Computer Animation and Simulation '95, Springer-Verlag, 14 unnumbered pages).

Independent claim 1 is directed to a method of simulating advection of a plurality of elements through space. The method includes generating a plurality of 2D grids in which each 2D grid is independent and has a plurality of grid points. Movement information is associated with each 2D grid point. The movement information associated with the 2D grid points changes over a time period that includes discrete intervals. A region of 3D space is defined using the 2D grids. The method also includes advecting the plurality of elements through the region of 3D space using the movement information associated with the 2D grids and displaying the simulated advection of the plurality of elements.

Referring to the subject action, the Examiner appears to concede that Harris does not specifically teach each feature of independent claim 1. In particular, the Examiner appears to concede that Harris is not understood to teach "advecting the plurality of elements through the region of 3D space using the movement information associated with the 2D grids." The Examiner appears to turn to Gamito for the teaching this feature. Referring to page 4, the subject action reads:

> l. Harris does not specifically teach:
> m. Advecting the plurality of elements through the region of ~~3D~~ space using the movement information associated with the 2D grids.
> n. Displaying the simulated advection of the plurality of elements.
> o. Gamito appears to teach:
> p. Advecting the plurality of elements through the region of 2D space using the movement information associated with the 2D grids (fifth page, section 4 A Particle-Grid Model, and figure 1).
> q. Displaying the simulated advection of the plurality of elements (last page, colour plate 1, Turbulent smoke stream).

The Applicants notice that the Examiner has crossed out particular terms in one instance of reciting claim 1 (item m.) and added a term (i.e., the first occurrence of "2D") in a second rendition of claim 1 (item p.). In particular, it is the Applicants understanding that the Examiner appears to suggest that the Gamito teaches advecting the plurality of elements through a region of 2D space by using movement information associated with 2D grids. It is the Applicants further understanding that the Examiner combines Harris (with Gamito), since Harris mentions 3D space.

However, Applicants assert that Gamito describes an algorithm for two dimensions and does not describe a methodology that is transferable to three dimensions. In particular, regarding the two dimensional algorithm, Gamito reads:

> This article presents a simple, fast and stable method for the animation and visualization of turbulent gaseous fluids <u>in two dimensions</u>. We draw on well known methods from computational fluid dynamics to model the fluid using vorticity and velocity fields...(Abstract, emphasis added)

In regards to using the Gamito two dimensional algorithm in a three dimensional space, the reference reads:

> At present, the method is only applicable for two dimensional flow fields. It has however, very low computational costs and can handle systems with large number of particles...(unnumbered page 2; last paragraph of section "1 Introduction"; emphasis added)

The reference also reads:

> Many improvements can be made to the algorithm. The first and most obvious one is the extension to a fully three-dimensional vorticity model...(unnumbered page 10, first paragraph of section "8 Future Developments")
>
> During the evolution of the flow, vortex filaments tend to stretch and become highly entangled in each other as the result of the vortex stretching mechanism. ... Such a three-dimensional vorticity algorithm will be harder to implement and will certainly be much slower. It is questionable whether such an algorithm can be useful for computer animation purposes. (unnumbered page 10, second paragraph of section "8 Future Developments"; emphasis added)

Thus, while Harris provides a method for visualizing gaseous fluids in two dimensions, the reference does not provide a three dimensional algorithm. Furthermore, the reference states that the described algorithm "is only applicable for two dimensional flow fields" and for producing a three-dimensional algorithm, the reference can only speculate that such an algorithm would "be harder to implement" and "questionable whether such an algorithm can be useful." As such, the Applicants assert that the reference teaches away from a method that includes advecting a plurality of elements through a region of 3D space using movement information associated with 2D grids, as required by independent claim 1. For at least this reason, amended independent claim 1 is believed to be patentable. Independent claim 2 and amended independent claim 4 include limitations that are similar to those described above with respect to claim 1. As such, independent claims 2 and 4 are also believed to be allowable for at least the same reasons noted above.

The dependent claim 3 partakes of the novelty of it's parent claim and, although it is believed that the dependent claim defines a separate patentable feature, for this reason the dependent claim is not discussed here in detail.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above

may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

In view of the foregoing remarks, the entire application is now believed to be in condition for allowance, and such action is respectfully requested at the Examiner's earliest convenience.

Applicants' undersigned attorney can be reached at the address shown below. All telephone calls should be directed to the undersigned at 617-368-2191.

The Applicants believe that no fees are due, however, if any fees are in fact due, please apply all charges or credits to Deposit Account No. 06-1050, referencing Attorney Docket No. 20567-023001.

Respectfully submitted,

Date: 15 February 2008

Jeffrey J. Barclay
Reg. No. 48,950

Fish & Richardson P.C.
Telephone: (617) 542-5070
Facsimile: (617) 542-8906